Castilleja linariifolia

Castilleja

Publication of the Wyoming Native Plant Society

Mar 2018, Volume 37(1)

Posted at www.wynps.org

True Grit: Sand-Entrapping Plants

Have you ever wondered about all of the sticky plants growing in Wyoming? Researchers probing the plant adaptation strategies of "psammophory" (literally, sand-accumulating morphology) found ways in which a plants' "sand armor" deters herbivory. The substrate entrapment served as an external physical defense in all tests with a couple California plant species, including a sand verbena (*Abronia latifolia*) and a pincushionplant (*Navarretia mellita*), against both mammalian and insect herbivores[1] (LoPresti and Karban 2016). They also ruled out the "camouflage contribution" theory, i.e., the reduced detectability of sand-plastered leaf surfaces as major factors that reduce herbivory levels.

Above: *Madia glomerata* (Mountain tarweed; Aster Family) is a psammophore, if ever there was one! This widespread native species flourishes in the company of nature's rototillers – gophers. We will see it in sticky glory at the 2018 Annual Meeting; see p. 4. Photo by: © Gerry Carr, used with permission.

Two species in the Nyctaginaceae (Four-o'clock Family) were the focus of research but the authors included a list of 110 genera and many more species that exhibit psammophory. Among them are about 20 species that occur in Wyoming (LoPresti et al. 2016).

They went on to quantify the "wear-and-tear" implications of imbibed sand on a common North American moth herbivore in its caterpillar stage, the white-lined sphinx moth (*Hyles lineata*; Sphingidae)(LoPresti et al. 2017). These caterpillars consumed sand totaling ~4-5% of ingested weight during feeding on the above-mentioned species of *Abronia*, resulting in extensive damage to their mouth parts (mandibles). Parallels were draw between the abrasion caused by sand particle consumption, and that caused by the silica content in grasses as it affects grazing and browsing behaviors.

The energy expense required for a plant to produce sticky exudates takes away from other uses and complicates other processes. These energy budgets have yet to be fathomed ...more true grit. bh

References

LoPresti, E.F. and R. Karban. 2016. Chewing sandpaper: grit, plant apparency, and plant defense in sand-entrappping plants. Ecology (97(4): 826-833.

LoPresti, E.F., P. Grof-Tisza, M. Robinson, J. Godfrey and R. Karban. 2017. Entrapped sand as a plant defence: effects on herbivore performance and preference. Ecological Entomology DOI: 10.111/een.12483.

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[1] Psammophory had less effect on certain guilds of insect herbivores, including leaf miners (LoPresti 2015) than the rest.

WYNPS News

Gentle Renewal Reminder: Please renew if you haven't already to continue membership and get the newsletter. See the form in the past newsletter, renew on-line, or do it on-the-spot at the annual meeting!

Field Trip Announcements: This issue includes our annual meeting trip announcement, as well as a separate event co-sponsored by Audubon/The Nature Conservancy/Biodiversity Institute, called the Wyoming Bioblitz. …If you are organizing a summer wildflower/native plant hike, and have announcement information ready, please send it to wynps@wynps.org before 15 April to get it included in the next newsletter, the May issue.

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Also: Bighorn Native Plant Society: Jean Daly, Treasurer (P.O. Box 21, Big Horn, WY 82833)

New Members: Please welcome the following new members to WYNPS: Jessica Artz, Pinedale; Nancy Barker, Hot Springs, SD; Julia and Paul Cook, Pinedale; Jacob Powell, Sheridan; Kevin Suzuki, Ennis, MT; Jennifer Toews, Wheat Ridge, CO.

Message from the President:

We're gearing up for our 2018 annual field meeting! This year finds us on the western side of the state at Hams Fork campground with Orval Harrison and Sherel Goodrich. We're going back to our roots and will host a rustic weekend without electricity or the usual amenities. So, bring your preferred camp gear and let's make the weekend a communal effort. We'll bring larger tents, tables, and camp chairs. I am looking forward to keeping our weekend primitive but full of incredible hikes and botanical information making this a memorable experience under the stars. Please keep checking our website to register and get the latest weekend events.

~Charmaine Delmatier, President

2018 Annual Meeting, July 20-22: See pages 4-6 in this issue for exciting plans. The registration form will appear on-line and in the next newsletter.

Treasurer's Report: Balance as of 27 Feb 2018: Scholarship = $1,815; General = $7,340; Total = $9,155.

Contributors to this Issue: Mark Andersen, Karen Clause, Charmaine Delmatier, Robert Dorn, Sherel Goodrich, Joy Handley, Bonnie Heidel, Dorothy Tuthill.

Next Deadline: Please send articles and announcements for the next issue by 15 April 2018. What would YOU like to hear about? Questions and suggestions are always welcome!

Wyoming Native Plant Society
P.O. Box 2449
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Well-LIKED

Over 1,000 people have taken a liking to the Wyoming Native Plant Society Facebook page (https://www.facebook.com/Wyoming-Native-Plant-Society-207193329359065/). If you are looking for a place to show off your favorite 2018 plant photos, look no farther. …THANK YOU, Karen!

Wyoming Place Name Greenery

Wyoming geography has perennial greenness in the plentitude of plant-based place names gracing its towns, lakes, peaks and more. Many Wyoming place names reflect a who's who in western and national history, but cartographers also had a whimsical streak if not a desperation in coming up with unique names. Plants were readily available.

Woody plants figured prominently, if only for their stature and firewood.

- Big Piney/Big Piney Creek (Sublette County) – Big Piney Creek was named for the pines along its course; Big Piney (the town) was named for the creek, though no pines followed the creek past the town.
- Boxelder/ Boxelder Creek (Converse County) – Boxelder was a Pony Express Station and Post Office (discontinued) named for the nearby creek.
- Forest – (Crook County) Forest was a Post Office (discontinued) named for the forest region in which it was located.
- Lone Tree Crossing/Lone Tree Pass – Lone Tree Crossing (Park County) was along travel routes crossing the North Fork of Dry Creek. Lone Tree Pass (Albany County) was named for a lone pine growing out of a granite boulder when a route was being scouted for the railroad west of Cheyenne; the lone pine survives to this day sandwiched between east- and west-bound lanes of I-80.
- Oakwood (Crook County) – Oakwood was a Post Office (discontinued) named for the surrounding oak trees.
- Pine Bluffs (Laramie County) – Pine Bluffs was named for the stunted pines on nearby bluffs.
- Pine Creek/Pinedale (Sublette County) – Pine Creek was named for the pines along its course; Pinedale (the town) was named for the creek, where pines did follow the creek through town.
- Pinyon Peak (Teton County) – Pinyon Peak was (mis)named for a close relative of the pinyon pines, whitebark pine (*Pinus albicaulis*)
- Willow Creek (Fremont County) – was named for the willows that lined its course.

The ABSENCE of woody plants is also registered in place names, as with Nowood Creek (Washakie County), where a cavalry detachment once camped in cold, wet conditions and was unable to find firewood.

Very few place names are based on the scientific name as opposed to the common name of the plant. The exceptions give us "Artemisia Geyser" in Yellowstone National Park, as well as "Campanula Creek", also in the Park.

Some place names based on the common names may still be species-specific (e.g., Kinnikinnic Lake was likely to refer to *Arctostaphylos uva-ursi*) whereas many, many place names are botanically vague:

- Grassy Creek (Hot Springs) – name of a creek and a village named after the Creek. Grassy Lake (Teton County) – name of a conspicuously grassy lake.
- Green Lakes (Sublette County) – Green Lakes were named for the dazzling green landscape. Green Mountains (Fremont County) – Green Mountains were named for the heavy growth of evergreens. But Green River (Sweetwater County) – the river and the town - were probably named for the greenish soapstone outcrops along the river banks

"Sage" sufficed as name for a railroad stop in Lincoln County, and "Sage Creek," at the opposite end of the state, was equally fitting in Niobrara County.

The visual appeal of flowers is evident in some place names:

- Lily Lake (two different lakes, both Park and Teton counties) – full of large water lilies.
- Mariposa Lake – named for the mariposa lily; Yellowstone National Park.
- Paintbrush Canyon (Teton County) – named for the Indian paintbrush.

At least one plant-based place name came from foreign languages: LaPrele Creek (Converse County) was named for the scouring rush (horsetail), called "prele" in French, growing along its banks.

One can only speculate on the "lost" place names given by Native American tribes, as in the case of "Quee-yah-pah" for tobacco root (*Valeriana edulis*) later named by cartographers as Bear River. Likewise, the Snake River was earlier called the Yampa River (*Perideridia* spp.) for the edible plant that grew in profusion along the river's banks. …But when it comes to food plants, we still have Huckleberry Mountain (Teton County)! bh

References

Urbanek, M. 1988. Wyoming Place Names. Mountain Press Publishing Company, Missoula, MT.

Wyoming Places, posted by the Wyoming State Library as a search tool to get locations, histories, and name origins of places in the great state of Wyoming. at: http://places.wyo.gov/ .

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The three destinations described in this announcement that are in **Bold Font** *are circled on the map (next page).*

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2018 Annual Meeting

July 20-22

Gear up for the 2018 annual field meeting! This year finds us on the western side of the state in the Wyoming Range, north of Kemmerer and east of Cokeville. Our home base will be **Hams Fork Campground**, in the Bridger-Teton National Forest. We are delighted that Orval Harrison, author of "History of Star Valley: Natural, Cultural, and Economic" will be our main speaker for Saturday night, July 21. He has titled his presentation the "History and Flora of the Wyoming Range," which will highlight its scientific exploration, geography, and natural resources. Adding to this great weekend, Sherel Goodrich will be our guide to Green Knoll and will lead us to beautiful tall-forb communities with dominants such as *Ligusticum filicinum* and *Osmorhiza occidentalis*. On Friday, when you arrive, we are pleased to offer a visit to the nearby **Big Spring** at your leisure.

This will be a rustic weekend without electricity or the usual amenities. Hams Fork Campground is a first-come, first-serve campground with 13 sites, two vault toilets, and potable water. Several people are planning to arrive early to occupy campsites for WYNPS. There are no other close-by campgrounds, but dispersed camping is allowed in the National Forest (for those who think pit toilets are for softies). In addition, there are several motels in Kemmerer, which is about 40 slow miles away.

Tentative Schedule

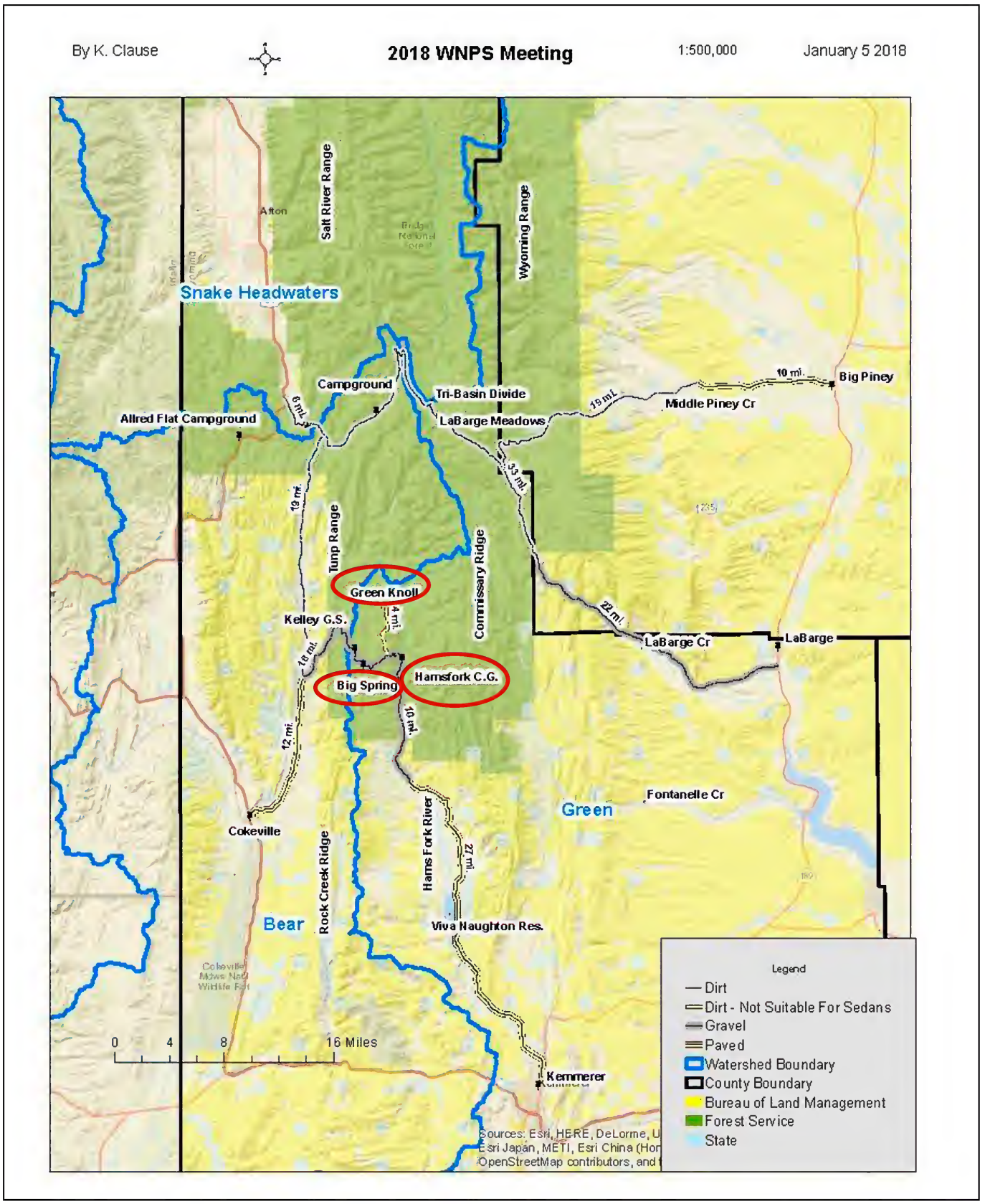
<u>Friday, July 20</u>
Check in at **Hams Fork Campground** after noon.
Informal visits to **Big Spring**, hosted by Martina Keil, Bridger-Teton NF Botanist. Big Spring is about 6 miles west of Hams Fork Campground. A short walk from the parking area and across the West Fork of the Hams Fork gets you to large spring that tumbles down a hillside.

<u>Saturday, July 21</u>
9 am All day hike to **Green Knoll**, Sherel Goodrich, Retired Botanist, Ashley National Forest, Utah, leader. **Green Knoll** is located about 5 road miles from Hams Fork Campground. Roads are ok to good in dry weather and semi-passable in wet weather with 4 wheel drive vehicles. We will spend the entire day on a single stop at Green Knoll where there is lots of room for parking off the rather infrequently used road. There are about 10 sites on the knoll where studies have been set up, all within 0.4 miles of each other. With about 1.5 miles of walking we can make a round trip to all these sites in one day with time to talk. Some of the study sites have photos dating back to 1957. We will see plant communities of *Lomatium bicolor* with heavy plowing by pocket gophers, *Ligusticum filicnum* (tall forb), *Osmorhiza occidentalis* (tall forb), *Artemisia tridentata* var. *spiciformis/Ligusticum filicinum*, *Geranium viscosissimum*, Graminoid without pocket gopher activity.

Dinner on your own, or join the communal dinner.

7 pm Orval Harrison, "History and Flora of the Wyoming Range." The history portion will be oriented toward scientific exploration, geography, and natural resources.

<u>Sunday, July 22</u>
7 am Annual business meeting
9 am half day hike TBA
9 am full day hike TBA



BRING THIS MAP ALONG or print out the color version from the on-line newsletter!

BE SURE TO CHECK THE WEBSITE (WYNPS.ORG) FOR THE LATEST INFORMATION ON THE ANNUAL MEETING.

Plant list for Green Knoll[2]

Abies concolor

Achillea millefolium

Allium brandegei

Artemisia tridentata spiciformis

Aster foliaceous canbyi

Aster integrifolius

Balsamorhiza macrophylla

Bromus marginatus

Campanula rotundifolia

Carex raynoldsii

Collomia linearis

Delphinium nuttallianum

Delphinium occidentale

Descurainia californica

Elymus trachycaulus

Epilobium brachycarpum

Epilobium spp.

Erigeron speciosus

Geranium viscosissimum

Hackelia floribunda

Hackelia micrantha

Helianthella quinquefolia

Heliomeris multiflora

Hydrophyllum capitatum

Ligusticum filicinum

Lomatium bicolor

Lupinus argenteus

Madia glomerata

Melica spectabilis

Nemophila brevifolia

Osmorhiza occidentalis

Pedicularis bracteosa

Phleum alpinum

Phlox longifolia

Pinus contorta

Poa arnowiae/P. leptocoma

Polygonum douglasii

Populus tremuloides

Potentilla gracilis

Pseudostellaria jamesiana

Ribes cereum

Senecio crassulus

Senecio integerrimus

Sidalcea oregana

Stipa lettermanii

Tragopogon dubius

Thalictrum fendleri

Trisetum spicatum

Valeriana occidentalis

Viola nuttallii

[2] Provided by Sherel Goodrich

WYNDD product helps botanist discover new rare plant population

By Joy Handley, WYNDD

Emma Freeland, Bureau of Land Management (BLM) botanist, noticed that a crew was heading out for some monitoring in an area that a Wyoming Natural Diversity Database (WYNDD) predictive distribution model (http://www.uwyo.edu/wyndd/files/docs/reports/wynddreports/u16and02wyus.pdf) had indicated as potential habitat for slender spiderflower (*Peritoma multicaulis*; syn. *Cleome multicaulis*). She decided to tag along and see if the plant was there and, YES! There it was - a new population, six miles from the nearest, previously known population.

Right: Slender spiderflower, by B. Heidel

"...So just wanted to let you know how useful those models have been for us. I still use them literally every day." – Emma Freeland

Announcing: New Wyoming Plant Species of Concern List

The 2018 Wyoming Plant Species of Concern list is now at your fingertips, through the homepage of Wyoming Natural Diversity Database (http://www.uwyo.edu/wyndd/). It contains the 423 vascular plant species/varieties considered to be of greatest conservation concern in the state[3]. Compared to the 2012 list, there were 33 deletions and 21 additions.

Brace yourself -- name changes abound! Scientific names follow the Wyoming Flora Checklist prepared by the Rocky Mountain Herbarium (Nelson 2018) – described in the *Friends of the Rocky Mountain Herbarium newsletter* (https://www.uwyo.edu/botany/rocky-mountain-herbarium/rm-friends-16feb2018.pdf). Common names follow the PLANTS database *almost* throughout.

The list is downloadable in pdf format; please feel free to contact us if you would like a spreadsheet version. Bold font highlights name changes - there are many species having changes to BOTH scientific and common names (see examples, below). This means that some familiar genus names are no longer in use – inserts are incorporated directly in the pdf version of the list (e.g., *Cleome* – see *Peritoma*; *Sphaeromeria* – see *Artemisia*) until we have more synonomy built into the system. bh

Table 1. Examples of changes to both scientific and common names among Wyoming plant species of concern[4]

Scientific name (Dorn 2001, as used in Heidel 2012)	**Common name (as used in Heidel 2012)**	**Scientific name (Nelson 2018, as used in Heidel 2018)**	**Common name (almost exclusively PLANTS db, as used in Heidel 2018)**
Carex parryana var. *unica*	Hall's sedge	*Carex hallii*	Deer sedge
Cleome multicaulis	Many-stemmed spider-flower	*Peritoma multicaulis*	Slender spiderflower
Lesquerella parvula	Narrowleaved bladderpod	*Physaria parvula*	Pygmy bladderpod
Sphaeromeria simplex	Laramie false sage	*Artemisia simplex*	Laramie chickensage

[3] The formal list update process started with consultation of the Wyoming botanical community in 2017, culminating ongoing information compilation (2012-present).

[4] Heidel, B. 2012. WY plant species of concern. Wyoming Natural Diversity Database. Laramie, WY.
Heidel, B. 2018. WY plant species of concern. Wyoming Natural Diversity Database. Laramie, WY.

Growing Native Plants

Part 27. More Short Shrubs for Flowers

By Robert Dorn

Dasiphora fruticosa (*Pentaphylloides floribunda*), Shrubby Cinquefoil, is a deciduous shrub to 4 feet tall and 3 feet wide. The leaves are compound with 3 to 7 leaflets, each leaflet to about 0.75 inch long. The flowers are yellow, saucer shaped, to 1 inch across, and solitary in leaf axils or a few clustered at branch tips often nearly covering the bush. They appear continuously from June to September with fewer later in the summer. The plants occur naturally in wet to moist mountain meadows. They prefer moist, cool, well drained soils and full sun but will tolerate partial shade, alkaline areas, and very wet areas and are somewhat drought resistant. There are many cultivars in the nursery trade some of which have more flowers but may require more water, or if with non-yellow flowers, they may not hold their color for long. They are easy to grow from seed or softwood cuttings and small plants can be transplanted. Cold stratify for 60 days if seed is sown in spring. About 1/3 of the old growth should be pruned off annually to prevent center die out.

Dasiphora fruticosa, Park County, Colorado

Penstemon fruticosus, Shrubby Penstemon, is a deciduous subshrub to 1.5 feet tall with a woody base and herbaceous new growth. The leaves are opposite and to 2.5 inches long. The flowers are blue-lavender to light purple or pink, to 2 inches long, and in a loose, terminal inflorescence 6 to 9 inches long. They appear from May to August depending on elevation. The plants occur naturally in moist, partly wooded or open, often rocky places in the mountains. They prefer full sun or light shade and well-drained soil. They can be grown from seed which requires cold stratification for at least 90 days. Cover lightly with soil. Cool temperatures help germination but still expect germination to be low. Cut back after flowering. Cultivars are available in the nursery trade.

Penstemon fruticosus, Pend Oreille Co., Washington

Physocarpus malvaceus, Mallow Ninebark, is a deciduous shrub to 5 feet tall and tends to form thickets. The leaves are 3 lobed and toothed and to 2.5 inches long and wide. The flowers are white, to 0.5 inch across, in compact rounded clusters at the tips of branches, and appear in June and July. The plants occur naturally on canyon slopes and in moist open woods in the mountains. They prefer light shade and moist loamy soils. They can be grown from seed that has

Physocarpus malvaceus, Ravalli County, Montana

been cold stratified for 60 days. Germinate at 80 degrees if possible for best results. They can also be propagated from semiripe wood cuttings. It is also in the nursery trade.

Physocarpus monogynus, Mountain Ninebark, is similar to the preceding species but smaller. The leaves are to about 1 inch long and wide. The seed capsules are reddish and remain over winter. Preferences and propagation are similar to that for *Physocarpus malvaceus* above.

Physocarpus monogynus, Albany County

Prunus pumila var. *besseyi*, Western Sandcherry, is an upright to more often spreading deciduous shrub to 4 feet tall and wide. The leaves are narrow, to 1 inch long, gray-green in summer, and turning orange to reddish in fall. The flowers are white, fragrant, to 0.5 inch across, in many small clusters on upper stems, and appear in April and May. They are attractive to pollinators. The fruit is small, to 0.5 inch across, edible, ripening to dark red, purple, or blackish, and attractive to birds. The plants occur naturally in dry grasslands and on rocky slopes or sandy places in the plains and foothills. They prefer full sun or light shade and well drained soils. They benefit from an occasional deep watering but overwatering will cause it to sucker. They can be grown from seed sown outside in the fall and barely covered with soil to allow some light exposure. Cold stratify the seed for 90 days if sown in spring. Several cultivars are available in the nursery trade. Prune out any damaged stems after flowering or after winter snow is gone.

Prunus pumila var. *besseyi*, Larimer Co., Colorado Cultivated

To see the above plants in color, go to the newsletter on the Society website.

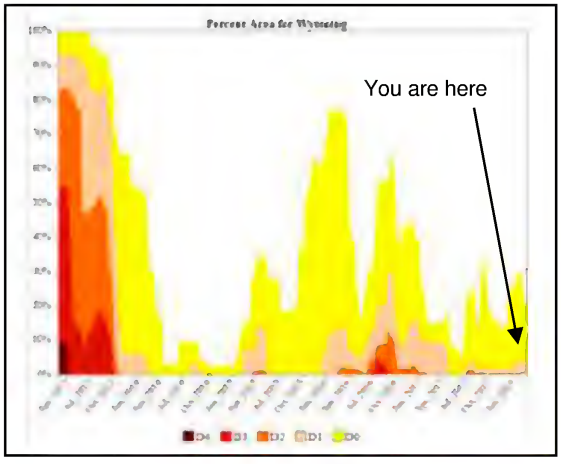
Announcing 2018 Bioblitz

The 2018 BioBlitz will be held at The Nature Conservancy's Tensleep Preserve outside of Ten Sleep, Wyoming, June 22-24. The BioBlitz is a weekend-long event in which teams of scientists, teachers, volunteers and environmental educators join forces to identify, research applied management questions, and learn about as many local plant, fungus and animal species as possible. We look forward to seeing you on the preserve for another year of science, education, and exploration! More information on the event is posted at: www.wyobiodiversity.org/Initiatives-Programs/CitSci/bioblitz.

Watching the Weather

At this time of year, the Wyoming Drought Monitor is an indication of spring conditions, a state-federal resource (https://www.drought.gov/drought/states/wyoming) – with weekly updates. It maps out which areas of the state are or are not in drought, and the varying levels of dryness ranging from abnormally dry to exceptional drought conditions. Eighty percent of Wyoming is at normal levels as of 5 March - hurray! Also included is a graph showing how much of Wyoming was covered by different levels of drought over the past five years (Figure 1).

Figure 1. Five-year drought trends in Wyoming



Wyoming Native Plant Society is a non-profit organization established in 1981 to encourage the appreciation and conservation of the native plants and plant communities of Wyoming. The Society promotes education and research through its newsletter, field trips, annual student scholarship and small grants awards. Membership is open to individuals, families, or organizations. To join or renew, please return this form to:

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_____

Email : _____

Check one: [ ] New member [ ] Renewing member

[ ] Renewing members, check here if this is an address change.

[ ] Check here if you prefer to receive the newsletter electronically

Membership

[ ] WYNPS annual membership: $10.00

[ ] WYNPS annual membership + scholarship support: $20.00 ($10.00 for membership and $10.00 for Scholarship fund)

[ ] WYNPS Lifetime membership: $300 ($150 for membership and $150 for Scholarship fund)

[ ] Sublette Chapter annual membership: $5.00

[ ] Teton Chapter annual membership: $5.00

Total enclosed: _____ THANK YOU!

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